



SEQUENCE LISTING

<110> Murphy, Brian R.
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Skiadopoulos, Mario H.
Tao, Tao

<120> USE OF RECOMBINANT PARAINFLUENZA VIRUSES (PIVs) AS
VECTORS TO PROTECT AGAINST INFECTION AND DISEASE CAUSED
BY PIV AND OTHER HUMAN PATHOGENS

<130> 15280-404100US

<140> 90/733,692
<141> 2000-12-08

<150> 60/170,195
<151> 1999-12-10

<160> 62

<170> PatentIn Ver. 2.1

<210> 1
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Sequence of
pFLC.PIV32CT, 15474 bp in sense orientation.

<400> 1
cttaagaata tacaaataag aaaaacttag gattaaagag cg

42

<210> 2
<211> 36
<212> DNA
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for N-P and P-M
junctions

<400> 2
gatccaacaa agaaacgaca ccgaacaaac cttaag

36

<210> 3
<211> 101
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for HN-L
junction

<400> 3
aggcctaaaa gggaaatata aaaaacttag gagtaaagtt acgcaatcca actctactca 60
tataattgag gaaggaccca atagacaaat ccaaattcga g 101

<210> 4
<211> 79
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of Measles HA gene insert for HN-L
junction

<400> 4
tcataattaa ccataatatg catcaatcta tctataatac aagtatatga taagtaatca 60
gcaatcagac aataggcct 79

<210> 5
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for GU insertion

<400> 5
aggaaaaggg aaatataaaa aacttaggag taaagttacg cgtgttaact tcgaagagct 60
ccct 64

<210> 6
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for NCR insertion

<400> 6
aggaaaaggg aacgcgtgtt aacttcgaag agtccct

38

<210> 7
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site
for supernumerary gene insert between the P and M
genes of rHPIV3

<400> 7
ttaacaatat acaaataaga aaaacttagg attaaagagc catggcgtac gaagcttacg 60
cgt 63

<210> 8
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PIV3 gene end
(GE) sequence

<400> 8
aagtaagaaa aa

12

<210> 9
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Cloning site

for RSV G and F gene inserts in B/H PIV3

<400> 9
aggattaaag aactttacccg aaaggtaagg ggaaagaaat cctaagagct tagcgatg 58

<210> 10
<211> 11
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence for RSV G gene insert in B/H PIV3

<400> 10
gcttagcgat g 11

<210> 11
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence of RSV G and F gene inserts in B/H PIV3

<400> 11
aagctagcgc ttagc 15

<210> 12
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Flanking
sequence for RSV F gene insert in B/H PIV3

<400> 12
gcttagcaaa aagctagcac aatg 24

<210> 13
<211> 83
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for PCR of measles HA gene insert for N-P and P-M
junctions

<400> 13

ttaatcttaa gaatatacaa ataagaaaaa cttaggatta aagagcgatg tcaccacaac 60
gagaccggat aaatgccttc tac 83

<210> 14

<211> 67

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for PCR of measles HA gene insert for N-P and P-M
junctions

<400> 14

attattgctt aagggttgtt cggtgtcggt tccttggatgg atcctatctg cgattggttc 60
catcttc 67

<210> 15

<211> 55

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for PCR of measles HA gene insert for HN-L
junction

<400> 15

gacaataggc ctaaaaggga aatataaaaaa acttaggagt aaagttacgc aatcc 55

<210> 16

<211> 68

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:

Reverse/Forward primer for PCR of measles HA gene
insert for HN-L junction

<400> 16
gtagaacgcg tttatccggc ctcgttgtgg tgacatctcg aatttggatt tgtctattgg 60
gtccttcc 68

<210> 17
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Reverse primer
for PCR of measles HA gene insert for HN-L
junction

<400> 17
ccatgttaatt gaatccccca acacttagc 28

<210> 18
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:
Forward/Reverse primer for PCR of measles HA gene
insert for HN-L junction

<400> 18
cggataaacg cgttctacaa agataacc 28

<210> 19
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Upstream HPIV2
HN primer

<400> 19
gggccatgga agattacagc aat 23

<210> 20
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Downstream
HPIV2 HN primer

<400> 20
caataagctt aaagcattag ttccc 25

<210> 21
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Upstream HPIV2
HN primer

<400> 21
gcgatgggcc cgaggaagga cccaatagac a 31

<210> 22
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Downstream
HPIV2 HN primer

<400> 22
cccggttcct gattccccga gcacgcttgc 30

<210> 23
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HPIV1 HN
primer

<400> 23
agtggctaat tgcattgcat ccacat 26

<210> 24
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: HPIV1 HN
primer

<400> 24
gccgtctgca tggtgaatag caat 24

<210> 25
<211> 13
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 25
cgcgccaggg ctg 13

<210> 26
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 26
cgcgccgagg cctg 14

<210> 27
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 27
cgcgaggcct ccgcg 15

<210> 28
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 28
cgcgccgcgg aggct 16

<210> 29
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oligomer
insert for rule-of-six conformity

<400> 29
cgcgccgcg gaggcct 17

<210> 30
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Forward primer
for RSV A G gene insert

<400> 30
aattcgctta gcgatgtcca aaaacaagga ccaacgcacc gc 42

<210> 31

<211> 92

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for RSV A G gene insert

<400> 31

aaaaagctaa gcgctagcct ttaatcctaa gttttctta cttttttac tactggcgtg 60
gtgtgttggg tggagatgaa ggttgtatg gg 92

<210> 32

<211> 65

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for RSV A F gene insert

<400> 32

aaaggcctgc ttagcaaaaa gctagcacaa tggagttgct aatcctcaaa gcaaatgcaa 60
ttacc 65

<210> 33

<211> 89

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for RSV A G gene insert

<400> 33

aaaagctaaag cgctagcttc tttaatccta agttttctt acttttatta gttactaaat 60
gcaatattat ttataccact cagttgatc 89

<210> 34

<211> 44

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mutagenic
forward primer for modification of rHPIV3-1 cDNA

<400> 34

cggccgtgac gcgtctccgc accggtgtat taagccgaag caaa

44

<210> 35

<211> 59

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Mutagenic
reverse primer for modification of rHPIV3-1 cDNA

<400> 35

cccgagcacg ctttgctcct aagttttta tatttccgt acgtctattg tctgattgc 59

<210> 36

<211> 95

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for insertion of HPIV2 F ORF into rB/HPIV3 genome

<400> 36

aaaatatagc ggccgcaagt aagaaaaact taggattaaa ggcggatgga tcacctgcat 60

ccaatgatag tatgcatttt ttttatgtac actgg 95

<210> 37

<211> 72

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for insertion of HPIV2 F ORF into rB/HPIV3 genome

<400> 37

aaaatatagc ggccgctttt actaagatat cccatatatg tttccatgtat tgttcttgg 60

aaagacggca gg 72

<210> 38

<211> 81

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
for insertion of HPIV2 HN ORF into rB/HPIV3 genome

<400> 38

ggaaaggcgc gccaaagtaa gaaaaactta ggattaaagg cgatggaaag attacagcaa 60
tctatctctt aaatcaattc c 81

<210> 39

<211> 54

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
for insertion of HPIV2 HN ORF into rB/HPIV3 genome

<400> 39

ggaaaggcgc gccaaaatta aagcattagt tcccttaaaa atggattat ttgg 54

<210> 40

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 40

gtaccatgga tcacctgcat ccaat 25

<210> 41

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for

construction of PIV3-2 chimeric cDNAs, PIV2 F
(antisense)

<400> 41
tgtggatcct aagatatccc atatatgttt c

31

<210> 42
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 42
atgcatcacc tgcataat

20

<210> 43
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2
(antisense)

<400> 43
tagtgaataa agtgtcttgg ct

22

<210> 44
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(sense)

<400> 44
catgagataa ttcatcttga tgtt

24

<210> 45
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(antisense)

<400> 45
agcttaaagc attagttccc ttAA 24

<210> 46
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(sense)

<400> 46
atcataatta ttttgataat gatcatta 28

<210> 47
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(antisense)

<400> 47
gttcagtgct tgttgtgtt 19

<210> 48
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 HN
(sense/antisense)

<400> 48
tcataattaa ccataatatg catcaat

27

<210> 49
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 HN
(sense)

<400> 49
gatggaattta attagcacta tgat

24

<210> 50
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(antisense)

<400> 50
atgcatcacc tgcatccaat

20

<210> 51
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 51

gatgatgtag gcaatcagc

19

<210> 52
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(sense)

<400> 52
actgccacaa ttcttggc

18

<210> 53
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(antisense)

<400> 53
ttaaaggcatt agttccctta aaaatg

26

<210> 54
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 F
(sense)

<400> 54
aagtattaca gaattcaaaa gag

23

<210> 55
<211> 20
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 HN
(antisense)

<400> 55

cttatttagtg agcttgttgc

20

<210> 56

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 F
(sense)

<400> 56

accgcagctg tagcaatagt

20

<210> 57

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV2 HN
(antisense)

<400> 57

gattccatca cttaggtaaa t

21

<210> 58

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 M
(sense)

<400> 58
gatactatcc taatattatt gc

22

<210> 59
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer for
construction of PIV3-2 chimeric cDNAs, PIV3 L
(antisense)

<400> 59
gctaatttg atagcacatt

20

<210> 60
<211> 15492
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Sequence of
pFLC.PIV32, 15492 bp in sense orientation

<400> 60
accaaacaag agaagaaaact tgtctggaa tataaattta actttaaattt aacttaggat 60
taaagacatt gactagaagg tcaagaaaag ggaactctat aatttcaaaa atgtttagcc 120
tatttgcatac atttaatgca cgtaggcaag aaaacataac aaaatcagcc ggtggagcta 180
tcattcctgg acagaaaaat actgtctcta tattcgccct tggaccgaca ataactgatg 240
ataatgagaa aatgacatta gctcttctat ttctatctca ttcactagat aatgagaaac 300
aacatgcaca aagggcaggg ttcttggtgt ctttattgtc aatggcttat gccaatccag 360
agctctaccc aacaacaaat ggaagtaatg cagatgtcaa gtatgtcata tacatgattg 420
agaaaagatct aaaacggcaa aagtatggag gatttgggt taagacgaga gagatgatat 480
atgaaaagac aactgattgg atatttggaa gtgacctgga ttatgatcag gaaactatgt 540
tgcagaacgg caggaacaat tcaacaattt aagaccttgt ccacacattt ggttatccat 600
catgtttagg agctcttata atacagatct ggatagttct ggtcaaagct atcactagta 660
tctcagggtt aagaaaaggc ttttcaccc gattggaagc tttcagacaa gatggaacag 720
tgcaggcagg gctggatttgc agcggtgaca cagtgatca gattgggtca atcatgcgg 780
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ctctatccac tctcagacca gatataata gattaaaagc tttgatggaa ctgtatttat 1020
caaaggacc acgcgctcct ttcattctgta tcctcagaga tcctatacat ggtgagttcg 1080
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ctgacaatat caagaccgaa caacaaaaca tcagagacag actaaacaag agactcaacg 1560
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aaacgacaca atcaacacaa gaacccagca actcagtgcc accatctgtc aaccagaaat 1980
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caaagaaacg acaccgaaaca aacagacaag aaacaacagt agatcaaaac ctgtcaacac 3660
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